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Senior High School

CURRICULUM GUIDE

GRAPHIC ARTS 12 - 22 - 32

Interim Edition

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Province of Alberta

Department of Education



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FOREWORD

Printing is so inextricably woven into the fabric of the daily lives of all citizens that to study it is to understand one of the most vital social forces of the present era. Handmaiden to the potent power of ideas, the printing press with the help of that second great force, modern mechanization, remains the greatest single potential power on earth.

For more than five hundred years printing has played the role of the Mother of Progress. Historians agree that Gutenberg's invention was one of the great catalysts that gave rise to the Renaissance of which our present civilization is still a part. Not only our civilization but our entire modern educational system is founded to a very large measure upon printing. As a key industry in twentieth century society, printing wields a mighty influence in shaping progress and national prosperity.

Hardly an individual exists in modern society who does not come into daily contact with the products of the printing press. The citizen in going about his daily work is constantly confronted with those things which of absolute necessity he must read, which he pays to read, or which he is encouraged to read by the advertising world. No other single industry places itself so completely in the path of the consumer. Housewife, schoolboy, laborer, artisan, businessman, office and service personnel, member of any profession, all have this in common, their dependency on the printed word. The influence of the printing press in modern life is inestimable.

Printing is a vital force in the field of education at all levels. Printing and education are inseparable. As early as 1546, less than one hundred years after the Gutenberg era, Carelius wrote: "This noble art has been the foster mother of all learning." Printing has since been called the art preservative of all arts. The printing press interprets, disseminates and preserves human knowledge. The limits of man's range of communication are constantly extending. His intelligible records can be read today, to-morrow or centuries after they have been recorded. When man's ideas are set in type and impressed upon paper, they are preserved for transmission across the generations.

Upon the efforts of the printer and the products of his press, rests to a very large degree the education of everyone throughout all the days of his life.

OBJECTIVES

The major objective of graphic arts in vocational education is to provide effective educational preparation for employment in industry. Vocational graphic arts courses:

- (1) Provide an opportunity for students to develop skills and techniques that are basic to the graphic arts industry.
- (2) Provides students with related and technical information essential to an understanding of the graphic arts trades and processes.
- (3) Develops in the student proper work habits and attitudes.
- (4) Develops in the student an appreciation of fine craftsmanship.
- (5) Prepares the student for self-supporting citizenship.
- (6) Develops in the student safety consciousness in his work habits and physical surroundings.

INTRODUCTION

The terms Printing and Graphic Arts are often used interchangeably nowadays. However, the connotation of the latter term in recent years indicates the activity of the printing industry in its broadest sense.

Stated briefly, it might be said that the graphic arts are the diverse processes by which man perpetuates his records and his thoughts in visible form, through writing, pictures and the various forms of printing. A study of the graphic arts must include the processes, the occupations, materials and tools employed, and the nature of the products.

In opposition to the earlier limited concept of printing in the school which embraced the letterpress processes and little else, today's graphic arts courses must offer experiences representative of the many facets of this rapidly expanding industry, most of which have developed in quite recent years. Although letterpress will probably continue to be the backbone of the industry, the student must be made aware of the challenge of other processes, particularly lithography, whose advances even since World War II have been nothing short of phenomenal.

Therefore, in addition to letterpress, today's graphic arts department must provide experiences in offset lithography, duplicating processes, intaglio, screen process work, engraving, thermography, blueprinting, rubber stamp and plate making, bookbinding, photo composition, color process work, flexography, and other developments as they occur. After three years in this department, the student will leave with a very good insight into this great industry and will carry with him such skills and knowledge that he would be a sought-after candidate for apprenticeship should he decide to seek a vocation in the graphic arts.

This three-year program in graphic arts for Alberta high schools will treat the subject in its broadest sense. The first year course content will be drawn mainly from letterpress which will form a logical and firm foundation for succeeding courses. In the second year lithography will play the leading role, coupled with advanced work in former processes. Ideally, the third year would be a laboratory type of situation, in which keenly interested students of proven ability would meet the challenges of experimentation, research and problem solving posed by the latest developments in the industry.

GENERAL INFORMATION

Student Personnel

It has been mentioned above that students of various levels of academic ability will find the work in the graphic arts department both interesting and challenging. Under the guidance of the skilful teacher any student who has passed the Grade IX examination and has average mechanical aptitude should succeed in the first year of the program. The same student, with sustained interest and effort coupled with regular attendance and desire for achievement, should have a good chance for success in the second year. However, the very nature of the third year course places it on a high plane. Standards of attainment will be such that the abilities of the best students will be constantly challenged. The demands of the English, mathematics and science involved in these advanced units will in themselves render the low-level student a very doubtful starter in the third year. It should be made very clear from the outset that no accommodation will be found for the non-achiever or other student shopping around the high school for easy credits.

Although most of the students will be boys, girls should be encouraged to enroll. No phase of the work will be objectionable to them. Experience has shown that they often excel in this department, as their older sisters do in the industry itself. It has been found in many instances that in those operations requiring a delicacy of manipulative skill, patience beyond the average, the artistic touch and creativity, girls excel. Some of the most promising opportunities for women in the industry lie in the expanding branch of offset lithography.

Students should have good eyesight and hearing, and generally speaking, the full use of all limbs.

Equipment

Where the three-year graphic arts program is offered in a vocational high school, the range of equipment must of necessity be truly representative of the work carried on in a modern commercial plant in order that the prospective apprentice will get a preview of his future occupation in proper perspective. Initial costs will not be low since graphic arts equipment must be imported into Canada almost entirely and is costly.

Individual work places for students, especially for the first and second years must be provided. Good lighting and ventilation are essential, the latter being especially important in those areas of the shop where molten metals and chemicals are handled. Darkrooms for lithography should be equipped with exhaust fans and dust-removing air filters. The need will be seen for plenty of work table space throughout the shop. Plenty of chalkboard and pin boards are most helpful.

An up-to-the-minute reference library of books, trade journals and periodicals should be available, in the shop. An immediate start should be made in the accumulation of audio-visual aids to be added to the shop library. Many valuable aids can be made by instructor and students as the work progresses. Projection equipment owned by the department and located in the shop is a great convenience and saves time and confusion if classes are not required to move to some other part of the school to view films, filmstrips and the like.

Size of Classes

The ideal size of class will number from 16 to 18 students. Classes numbering above 20 are not advised.

Course Credit Values

Graphic Arts 12 - 5 credits
Graphic Arts 22 - 15 credits
Graphic Arts 32 - 15 or 20 credits

NOTE: In order to permit students from an academic Grade X program to cross over into the vocational program at the Grade XI level, schools may combine the "12" and "22" courses into one course to be offered for a total of 20 credits to students in Grade XI.

Instructor's Records

The instructor should keep accurate records of:
Student enrolment and attendance
Student accounts
Student work activity
Theory covered
Tests given
Student achievement
Up-to-date inventory of all equipment.

Course Designation

1st Year - Graphic Arts 12

2nd Year - Graphic Arts 22

3rd Year - Graphic Arts 32

Required Textbooks

For Graphic Arts 12:

Cleeton and Pitkin: GENERAL PRINTING
McKnight & McKnight Publishing Co.,
Bloomington, Illinois.

For Graphic Arts 22:

Cleeton and Pitkin: GENERAL PRINTING

and

Cogoli, John E.: PHOTO-OFFSET FUNDAMENTALS
McKnight & McKnight Publishing Co.,
Bloomington, Illinois.

For Graphic Arts 32:

Cogoli, John E.: PHOTO-OFFSET FUNDAMENTALS

Students' Notebooks

Throughout his experience in the graphic arts department, the student will be expected to keep neatly prepared portfolios of notes, drawings, layouts, job and instruction sheets, proofs, job samples, etc. In short, at the end of each course he will have a complete record of his studies and work activities.

If the notes are prepared in looseleaf form, of uniform size, during the year, it will be possible at the term's end to arrange them in chronological order, number the pages, include a table of contents, and bind the completed notes between flexible covers as a final assignment. Nowhere else in the school is there a better opportunity to teach the student how to make and preserve his notes. This shop's very nature is a "natural" in this respect.

SAFETY IN THE GRAPHIC ARTS SHOP

The prime concern of the teacher is the safety of the students and of the expensive equipment and materials in his shop. Courses of studies include safety among the stated objectives. Probably it should head the list.

The point of view which is favored here is to see safety as an outcome of the complete and efficient organization of the shop situation. Safety lies among the many desirable outcomes and behaviour patterns associated with each and every unit of instruction. It is a result of a development of those attitudes and work habits which are conducive to a situation safe for all workers therein. It reflects the conduct of a good citizen both in and out of the shop. "To work safely one must live safety."

The instructor must teach safety and must be everlastingly on the alert to see that all students observe to the letter all rules of safe conduct and safe tool and machine operation, whether or not these rules have been stated orally or posted in key places about the shop.

The law requires that the teacher must assume the role of a judicious parent and more, holding him responsible for any negligence in this regard. As one safeguard for all concerned, it is suggested that from time to time the students should be tested on the subject of safety and that the written test results be filed away in a safe place for ready reference in case of an emergency. This stands as one form of rebuttal when after an accident the victim makes some such well-worn statement as, "I didn't know." "The teacher never told us." "I guess I goofed."

Somewhere during the course of his own training, the teacher will have had this matter of safety education impressed upon him. In the course of his career as a teacher, he must never lose sight of the seriousness of his obligations in this connection.

"Every accident is someone's responsibility."

"An accident doesn't just happen."

"The best safety device is a safe worker."

"Machines can't think. YOU must, always."

REFERENCES RECOMMENDED FOR THE GRAPHIC ARTS

The following short list of reference books includes the works of outstanding graphic arts teachers in America. Any or all of them would be valuable additions to the shop library of the graphic arts department. They cover all of the major units of instruction of the three-year course of studies. Two of them have already been indicated as required textbooks. The teacher should make every effort to acquire these references, and others as time goes on. They should be made readily available to students who will be expected to complete reading assignments from them from time to time during their stay in the shop.

The listing is alphabetical by authors.

Berry, Johnson & Jaspert: ENCYCLOPAEDIA OF TYPE FACES
Blandford Press Ltd., London W.C.1, England.

Carlsen, Darvey E.; GRAPHIC ARTS
Chas. A. Bennett Co., Inc., Peoria, Ill.

Clark, Florence E.: THE PRINTING TRADES AND THEIR WORKERS
International Textbook Co., Scranton, Penn.

Cleetkin and Pitkin: GENERAL PRINTING
McKnight & McKnight Publishing Co., Bloomington, Ill.

Cogoli, John E.: PHOTO-OFFSET FUNDAMENTALS
McKnight & McKnight Publishing Co., Bloomington, Ill.

Delmar Publishers Inc.: PRINTING LAYOUT AND DESIGN
Thos. Nelson & Son Ltd., Toronto 1, Ont.

Eisenberg & Kafka: SILK SCREEN PRINTING
McKnight & McKnight Publishing Co., Bloomington, Ill.

Groneman, Chris. H.: GENERAL BOOKBINDING
McKnight & McKnight Publishing Co., Bloomington, Ill.

Hague, C. W.: PRINTING AND ALLIED GRAPHIC ARTS

PRINTING INSTRUCTION SHEETS

Set 1: Letterpress Printing

Set 2: Advanced Composition

GRAPHIC ARTS INSTRUCTION SHEETS, New Edition
The Bruce Publishing Company, Milwaukee, Wis.

Jackson, Hartley E.: PRINTING: A PRACTICAL INTRODUCTION
TO THE GRAPHIC ARTS
McGraw-Hill Book Co., Inc., Toronto, Ont.

Kagy, Frederick D.: GRAPHIC ARTS
The Goodheart-Wilcox Co., Inc., Chicago, Ill.

Karch, R. Randolph: GRAPHIC ARTS PROCEDURES
American Technical Society, Chicago 37, Ill.

BASIC LESSONS IN PRINTING LAYOUT
The Bruce Publishing Co., Milwaukee, Wis.

Kosloff, Albert: ART AND CRAFT OF SCREEN PROCESS PRINTING
The Bruce Publishing Co., Milwaukee, Wis.

Marinaccio and Osburn: EXPLORING THE GRAPHIC ARTS
International Textbook Company, Scranton, Penn.

McMurtrie, Douglas C.: THE BOOK: THE STORY OF PRINTING AND
BOOKMAKING
Oxford University Press, Toronto, Ont.

Og, Oscar: THE 26 LETTERS
Thomas Y. Crowell Co., New York, N. Y.

Polk, Ralph W.: THE PRACTICE OF PRINTING
ELEMENTARY PLATE PRESSWORK
ELEMENTARY PRINTING JOB SHEETS
Chas. A. Bennett Co., Inc., Peoria, Ill.

Pratt, Guy A.: LET'S BIND A BOOK
The Bruce Publishing Co., Milwaukee, Wis.

Reddick, De Witt C.: JOURNALISM AND THE SCHOOL PAPER
D. C. Heath and Company, Boston, Mass.

Mertle and Monsen: PHOTOMECHANICS AND PRINTER
Mertle Publishing Co., Chicago, Ill.

RECOMMENDED PERIODICALS

CANADIAN PRINTER & PUBLISHER,
MacLean-Hunter Publishing Co., Toronto, Ont.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
The Bruce Publishing Co., Milwaukee, Wis.

SCHOOL SHOP
Prakken Publications, Ann Arbor, Mich.

SOME INSTRUCTIONAL AIDS AVAILABLE TO THE GRAPHIC ARTS TEACHER

In general, audio-visual teaching aids are used to create interest, give definite information, follow up or review a teaching situation, or to improve the attitude of the student. Some teachers may think that they can replace classroom instruction with a good teaching aid. Actually these several aids are designed to augment rather than to replace good teaching procedures. It is not the intention that the instructional aid will be used as a means of entertainment, although students usually do enjoy them. On the other hand the resourceful teacher can supplement and vitalize his instruction through the skilful introduction of timely aids.

Some reputable instructional aids will now be considered with particular reference to the graphic arts.

1. The Chalkboard, the oldest and most versatile visual aid in every classroom, offers many very effective possibilities for the teacher who has developed the ability to exploit it to the fullest. Written notes, sketches, drawings, charts, layouts, etc., placed on the chalkboard during the course of certain lessons, or preferably in advance for the more involved items, are wonderful aids. The shop should be equipped with many pieces of chalkboard, some stationary and some movable. Students should be required to reproduce some of this material which they will file away in their note folios for future reference. If the teacher can show the way in chalkboard sketching, drawing and neat handwriting, the students will be encouraged to develop similar skills on paper.

2. Further types of two-dimensional aids include the bulletin board, wall charts, graphs, and displays of printed and pictorial matter. Much of this material can be prepared by the teacher with the help of the students right in the shop. Much other may be secured for the asking from the educational departments of manufacturers of type, presses, paper, inks, etc.

Two important points to remember in the use of this material are, first, that some actual teaching must accompany the display. Just to pin up a poster or a chart is no guarantee that the student will even see it. His attention must be directed to the features which the teaching aid is expected to put across. And secondly, material of this kind must be kept up-to-date and changed

at regular intervals to catch student interest. Anything that has a layer of dust on it will merely catch more dust.

3. Three-dimensional aids can be employed in the form of large paper or wooden models of such items as a piece of type (to teach anatomy), the line gauge, composing stick, type high gauge, and so on. Students will gladly help to make these models and to paint them in distinctive colors. These models have great teaching value.

Cut-away models may be made to illustrate certain machine operations or specific working parts. The operating principles of presses, - letterpress, offset and gravure, can be explained most admirably with the help of these models.

This category would also include samples of projects, such as booklets, brochures, photo albums, memos, etc.

4. Audio-visual aids. Modern schools are now equipped with various types of projectors for silent and sound films, film strips, slides and opaque materials. There are sources of these aids for the graphic arts. The same sources that were mentioned above are good. Many are available for free showing, some on a rental basis. Others may be purchased by the school from time to time, thus gradually building up a school shop film library. As previously mentioned, the ideal situation would be for the graphic arts department to have at least a sound film projector located in the shop for its sole and immediate use. A lot of good teaching must accompany the use of audio-visual aids to assure that they will not become merely amusing breaks from serious work. Certainly the teacher must pre-view all films before showings to classes.

5. Sources of printed materials are widespread. Manuals, books, workbooks, job and instruction sheets are now available at reasonable prices from publishers who make a specialty of this sort of teaching material. Much is free for the asking on school stationery. If these aids are properly filed as received, they will be at the teacher's fingertips when needed from time to time during the year.

6. The field trip is more of a teaching method perhaps. However, a visit to a commercial printing plant immediately becomes an audio-visual experience in the best sense of the word. The reverse of the industrial visit is the visit of a representative from industry to the class, to speak to the students and to show films, products, etc.

7. The tape recorder, television and the teaching machine have value peculiar to each in certain teaching situations, mainly academic to date. Undoubtedly their virtues will be more fully demonstrated in technical and vocational fields as time goes on.

Course Outline

for

GRAPHIC ARTS 12

COURSE CONTENT OF THE FIRST YEAR

The content of the first year course has been organized in the form of learning and/or doing units. Although considerable thought has been given to the sequential order of the units, this is in nowise arbitrary. It is obvious that no portion of the total course can be treated in isolation. Certain units must be introduced almost coincidentally or as the need or convenience arises. The resourceful teacher will plan his work around these units of instruction to the best possible advantage as the year progresses.

This first year will be an exploratory experience for the student, without detracting from the large body of knowledge and goodly amount of skill which he will be called upon to master. In any case, he will have a good grounding in the various phases of the subject as outlined in all of the units of study which follow.

There will be little or no place in the first year for production work. Outside interests will not be permitted to exploit the time of the student. However, he may be encouraged to engage in activities and undertake elementary projects directly related to his own interests and his home as far as possible.

The units of instruction do not include direct references to the required textbook or the other twenty or more reference books recommended for the shop library. It is presumed that the well trained and enthusiastic teacher will be resourceful in his organization of instructional materials. The references are rich in suggestions for these teaching materials to the extent that the fear would be, not where to secure enough, but rather where to find enough time in the school year to do justice to all that is available.

CHECKLIST OF UNITS OF INSTRUCTION FOLLOWS:

1. Role of the graphic arts industry in modern life
2. The California job case
3. Spacing materials
4. The anatomy of type
5. Hand composition and distribution
6. Tying up a type form

7. Operation of the proof press
8. The printer's system of measurement
9. Characters difficult to recognize
10. Proofreading
11. Hyphenation
12. Straight matter composition
13. Cutting and mitring
14. Development of the alphabet
15. Basic typeface sizes
16. Basic typeface weights and widths
17. Determining correct placing of unfamiliar type
18. Origin and classification of typefaces
19. Bordering procedures
20. Introduction to layout
21. Lock-up for the platen press
22. Platen press feeding
23. Preparation of the platen press for running
24. Machine composition
25. Introduction to lithography
26. Introduction to bindery
27. Career opportunities in the industry
28. Graphic arts terms

THE ORIENTATION OF THE NEW STUDENT

The wise teacher will "gain time by losing a little of it" on the occasion of the first meeting with the various classes. This orientation should be carefully planned and an hour (or a period) spent in this way will pay dividends. However, an hour-long lecture defeats the purpose.

The teacher can firmly, but courteously, let the newcomers know what he expects of them as regards behavior patterns, attitudes towards work and fellow students, that the student who is not there "on business" is not welcome, and so on. This very well equipped graphic arts shop is a place for work and study, and a place where students will work in safety. There is a promise of many interesting and even fascinating experiences, as well as those occasions of monotony which are characteristic of some activities of the printer, and which will test the student's patience and perseverance. All these points can be covered expeditiously.

The teacher will take the students on a tour of the entire shop, making sure the group stays together with no strays permitted. He will identify the machines, hand tools and other pieces of equipment, showing examples of what they can do, and answering the students' questions concisely and patiently. He will have on display examples of the work of former students. Perhaps he will have a press inked up and ready to run. If he will run a few copies of some suitable job of which he can hand one to each student, he will stir the interest in the group.

After the students have returned to their seats, a brief resumé of the year's work is in order. A brief discussion of standards of attainment, necessity for regular attendance and punctuality, safety consciousness, the keeping of notes, etc., could be followed by a question and answer period as time permits.

The hour will soon slip away. The skilful teacher will not permit the time to drag. If the students take with them on this first day the impression that they have met up with a challenging situation where much will be expected of them, where the teacher knows his business and means business, and that the business will commence on their very next visit, then the orientation was a success and the groundwork will have been well laid for a good year ahead.

EXERCISES AND PROJECTS

Unlike certain other courses, such as woodwork and metalwork, the graphic arts do not provide very many opportunities for "take-home" projects. The beginning weeks in particular will afford little or no such opportunity. The many typesetting exercises employed to develop skill and knowledge can hardly be classed as projects.

However, as the work progresses some good interest-provoking projects can be introduced. The teacher should draw from the ideas of the students as far as possible, while at the same time circumventing any risk of exploitation of the shop or the time of the students by parents or others. Home-inspired projects can be very good but the teacher must be the judge as to their acceptability. The school graphic arts shop is not in the printing business.

In most shops the students are required to pay the bare cost of materials used in projects which are taken home. Here again the discretion of the teacher will determine what charges are made, in keeping with the general policy of the school. Obviously, small projects like scratch pads and grocery memos which use up offcuts that might otherwise be discarded should not be charged to the student, when he can take them home as good public relations materials as far as the shop is concerned.

Some suggested projects for first-year students are listed below, in line with what has been stated above, for the use of the student or his immediate family.

Scratch pads	Gummed mailing labels
Memo pads	Party place cards
Grocery lists	Party dance programs
Phone lists	Party napkins
Personal name cards	Blotters
I.D. cards with photo	Address books
Personal letterheads	Photo albums
Envelopes	Autograph albums
Tally cards	Imprinting of greeting cards
Tea coasters	Receipt books
Book marks	Travel expense booklets
Recipe cards	Wall mottoes

UNIT ONE: ROLE OF THE GRAPHIC ARTS INDUSTRY IN MODERN LIFE

Specific Objective

To impress on the student the important and honored role of the graphic arts in the lives of all citizens.

Suggested Studies

1. Printing, "the Mother of Progress".
2. "The Art Preservative of the Arts and Sciences"
3. Great contribution to the Renaissance of learning.
4. Printing and education inseparable; the rise of literacy and dissemination of knowledge.
5. Impact of printing in the citizen's daily life.
6. Contribution to modern merchandizing, packaging, etc.
7. Propaganda and the printed word.
8. Employment and production figures, placing the graphic arts industry among the top six in America.
9. Employment in related industries.
10. The printer, a highly and broadly educated man.

Student Work Activities

The student will participate in class discussion of suggested studies. He will share in research assignments and present written and/or oral reports prepared by himself or as a member of a committee.

UNIT TWO: THE CALIFORNIA JOB CASE

Specific Objective

To thoroughly acquaint the student with the California job case, in order that he can set type from it with reasonable speed and accuracy.

Suggested Studies

1. "Upper" and "lower" cases of earlier days.
2. Origin of the California case.
3. Present popularity of the California case.
4. The "lay" of the case including the caps, lower case letters, figures, punctuation marks, ligatures, special characters, spaces and quads.
5. Utility of the "lay" as presently adopted in America.
6. Importance of quick and accurate manipulation of the contents of the case in hand composition.

Student Work Activities

Practice using blank chart to master lay of the case.

Each student assigned to a numbered case of body type for his individual use in later practice work.

Frequent use of the case in exercise work to develop the skills of hand composition.

Student self-testing using printed blank forms of the case outlines supplied by the teacher.

Student will keep the type cases in the shop clean in order that his future work will not be hampered by dirty cases.

Student will compare the lay of the California case with other cases still in use in the industry.

UNIT THREE: SPACING MATERIALS

Specific Objective

To give the student a clear understanding of the materials and methods used by the compositor to fill out blank spaces in and around type forms.

Suggested Studies

1. The "em, the unit of size for spaces and quads.
2. Size scheme for spaces and quads based on the em.
3. 3 to em spacing most pleasing and legible.
4. Combinations of spacing; role of optical spacing.
5. Correct spacing techniques.
6. Hair spaces; restrictions on their use.
7. Leads and slugs; necessity for accuracy of measure.
8. Reglets and furniture; their use in lock-up.
9. Spacing and typographic design.

Student Work Activities

Mastery of correct spacing techniques through constant use of spacing materials in hand composition and lock-up.

Student will prepare a diagram of comparative sizes of spaces and quads for his own reference and to file with his notes.

Student will have practice in the handling of reglets and furniture in future lock-up work.

UNIT FOUR: THE ANATOMY OF TYPE

Specific Objective

To give the student a close acquaintance with the anatomy of type and of type metal alloys.

Suggested Studies

1. Close examination of type characters to identify the body, face, feet, groove, nick, counter, neck, shoulder and to learn the purpose of each feature.
2. Type metal; its alloying for foundry type, monotype, linotype.
3. Type high, the universal measurement of .918".
4. Care of type faces; how they may be injured through careless or rough handling during setting, distribution, lock-up, presswork and in use of tweezers.

Student Work Activities

Preparation of an isometric diagram of a type character with appropriate side notes identifying features of its anatomy.

The student will develop an appreciation of fine types and will constantly exercise care in handling them in order that they will give long service in the shop.

UNIT FIVE: HAND COMPOSITION AND DISTRIBUTION

Specific Objective

To teach the fundamentals of hand composition and to develop in the student skill in handling type.

Suggested Studies

1. The composing stick, its parts and adjustments.
2. How to hold the stick and to set it to measure.
3. Procedure in picking type characters from the case and setting them in the stick to form words.
4. How to space, quad, flush left, flush right, and to center words in a line.
5. Use of leads and slugs for line spacing.
6. Importance of type standing on its feet.
7. Necessity of returning lines of type to the stick for correction of errors.
8. Type distribution; manner of holding lines of type in left hand; deft manipulation of characters by fingers of right hand in returning them to the case; great importance of accuracy in distribution in order that the cases may always be clean.

Student Work Activities

Under close supervision by the teacher, the student will practice setting words, phrases, short sentences, etc., returning each line in turn to the case before proceeding with the next exercise.

Setting short stanzas of poetry or other exercises involving centering, flush left and right, use of ligatures, punctuation marks, ampersand, etc.

Practice of correction of errors in the stick.

Student will proceed from preliminary practice exercises to "live jobs" which will go to lock-up.

UNIT SIX: TYING UP A TYPE FORM

Specific Objective

To teach an accepted procedure in tying up type forms preparatory to proofing or storage in the galley.

Suggested Studies

1. Tools and materials required.
2. "Dumping the stick".
3. Tying procedure.
4. The printer's knot.
5. Untying a type form.
6. Importance of always skeining the string.

Student Work Activities

Frequent practice by the student, the operation being repeated whenever a line or more of type must be removed from the stick to stand in the galley.

Student will learn that type forms will never be taken to the proof press or stored without proper tying.

Student will prepare a written analysis of the tying procedure and file with his notes.

UNIT SEVEN: OPERATION OF THE PROOF PRESS

Specific Objective

To develop skill in the use of the proof press.

Suggested Studies

1. Function of the proof press.
2. Its operating principle.
3. Procedure for small forms; large forms.
4. Proof press maintenance.

Student Work Activities

with practice each student will be entitled to use the proof press whenever the need arises in conjunction with his typesetting jobs.

UNIT EIGHT: THE PRINTER'S SYSTEM OF MEASUREMENT

Specific Objective

To acquaint the student with the mathematics of the printer as related to the American Point System.

Suggested Studies

1. Origin of the Point System.
2. The "point", the unit of measurement.
3. Universal application in sizes of type, leads and slugs, spaces and quads, reglets and furniture.
4. Terms, such as, non-pareil, pica.
5. Type high standardization.
6. The line gauge, the printer's measuring tool.
7. Pica measures for hand and machine composition.

Student Work Activities

The student will of necessity make constant use of his knowledge of the point system in composition, make-up, lock-up and layout work.

Teacher-devised exercises giving the student practice in the application of the point system.

UNIT NINE: CHARACTERS DIFFICULT TO RECOGNIZE

Specific Objective:

To teach methods of distinguishing letters, figures and punctuation marks which are confusing to the student in their reverse format.

Suggested Studies

1. "Tail pulling" method for the "demons", b, d, p, q.
2. "Hinge" method preferred for most "demons".
3. Features of design or comparison of set size required for lower case "l", capital "I", numeral "1", leading quotation marks, apostrophe and comma, capital "O" and zero.

Student Work Activities

Exercises devised to contain an abundance of "demon" characters, extending possibly to include multiple justification of several columns of selected examples.

UNIT TEN: PROOFREADING

Specific Objective

To give the student a knowledge of proofreader's marks and how to use them.

Suggested Studies

1. Origin of proofreading.
2. Qualifications of a full-time proofreader.
3. Duties of the proofreader.
4. The proofreader's reference library.
5. The most commonly used proofreader's marks; a universal shorthand system for printers.
6. Special terms, such as, railroading, horsing, kite strings, revises, etc.

Student Work Activities

Student will set a chart in type upon which will be marked the symbols set out during study of same.

Student will be required in all future work to read and mark proofs in accepted fashion.

UNIT ELEVEN: HYPHENATION

Specific Objective

To place before the student a strict set of rules for word division.

Suggested Studies

1. Prepared notes with examples put into hands of student for point-by-point perusal and study.
2. Sounding of syllables taking precedence over grammatical divisions of prefix and suffix.
3. Imperative requirement of uninterrupted reading from line's end to beginning of next line.

Student Work Activities

Testing of students with prepared lists of words which evoke rules.

Practical applications of rules of hyphenation, particularly in exercises of straight matter composition.

REPORT

DATE

REPORT NO.

BY

FOR

PROJECT

DESCRIPTION

REMARKS

CONCLUSION

RECOMMENDATIONS

UNIT TWELVE: STRAIGHT MATTER COMPOSITION

Specific Objective

To teach the student the rudiments of the art of fine spacing to the end that his composition of straight matter will indicate his grasp of accepted practices.

Suggested Studies

1. Discussion and demonstration of basic rules of straight matter composition.
2. Comparative widths of spacing between words to be studied and practised.
3. Critical examination of examples from books, magazines and newspapers.
4. Hand composition basic to machine composition as regards fine spacing.
5. Approved rules for proper spacing.
6. Justification techniques.
7. Standard paragraph indention.
8. Rules governing the use of initial letters and other paragraph styles.

Student Work Activities

Each student will set, proofread and after correction of errors distribute examples of straight matter composition, demonstrating close attention to the art of fine spacing on the printed page.

Practice will extend to the setting of paragraphs involving initial letters, inverted pyramid, hanging indention, square indention, etc.

UNIT THIRTEEN: CUTTING AND MITERING

Specific Objective

To teach the application of the Point System in shop practice involving the cutting and mitering of strip cast materials.

Suggested Studies

1. Operation of the slug cutter.
2. Advantages of cutting leads and slugs one point scant for typesetting and lock-up clearance.
3. Necessity of precise measure when cutting borders and supporting material.
4. Operation of mitering equipment.

Student Work Activities

Enclosing parts of preliminary typesetting exercises such as lists of words or phrases, schedules or paragraphs within side-shouldered rules, utilizing both butted and mitered corners.

Final exercise might involve the setting, lock-up and printing of a small two-color job, such as a gummed mailing label, wherein the border work is a feature.

UNIT FOURTEEN: DEVELOPMENT OF THE ALPHABET

Specific Objective

To introduce the historical background to modern type faces, the written and printed word.

Suggested Studies

1. Picture writing, man's earliest attempts to record his history.
2. Symbols, hieroglyphics, cuneiform writing, tablets of stone and clay, etc.
3. Roundabout origin and development of the alphabet in Egypt, Phoenicia, Greece, Rome.
4. Early hand-written scrolls; later manuscripts; beginnings of bound books.
5. Differentiate: papyrus, parchment, paper.
6. Role of the Orient in making of papers, inks, individual block characters and prints.
7. European woodblock prints.
8. Refinements in alphabet letter forms and adoption of Arabic numerals.

Student Work Activities

As class discussion and research on this study progresses, the student will keep records in outline form to be filed with his notes.

Committees of students can be appointed to prepare illustrative material which might be lithographed by a senior class for distribution to the students.

UNIT FIFTEEN: BASIC TYPEFACE SIZES

Specific Objective

To thoroughly acquaint the student with the range of body sizes.

Suggested Studies

1. Proportional increase of 2 points, 6 points, and 12 points as body size increases.
2. Fractional increase of body size as used to "fill" newspaper column space.
3. Reference to "agate line" as universal measure, standard in publications; reference to ABC Quarterly Audit.
4. Wood type termed in "lines."

Student Work Activities

Progressive exercise work to include increased use of different sizes of type.

Proofs for notebooks to be marked with type sizes to instill familiarity.

Perusal by student of illustrated catalogues of type faces supplied by leading foundries.

UNIT SIXTEEN: BASIC TYPEFACE WEIGHTS AND WIDTHS

Specific Objective

To teach the student to recognize appearance categories involving weights of face and letter widths.

Suggested Studies

1. Recognition of differences in weight of face, from light to extrabold.
2. Recognition of differences in letter width, from extra-condensed to extra-expanded.
3. Use of weight and width range for copy-fitting.
4. Variance limited to "workhorse" faces only.
Note that other typefaces do not lend themselves to changes in weight or width.
5. Variations provided by outline, shading, swash and ornated designs.

Student Work Activities

Inclusion of situations within exercises where emphasis, harmony or copyfitting demand suitability of weight or letter-width.

UNIT SEVENTEEN: DETERMINING CORRECT PLACING OF UNFAMILIAR TYPE

Specific Objective

To present a systematic approach to the distribution of unfamiliar type, including the tracing of wrong font and orphaned characters.

Suggested studies

1. Appreciation by students of the value of cases free from wrong fonts.
2. Preliminary assumption of type family appearance by observation of serif style, variation of weight of strokes, status of face weight and letter width after measuring body size.
3. Comparison for identical face features with several specific characters taken from "assumed" case.
4. Comparison for identical set size.
5. Comparison of nicks if multiple pattern (single nick pattern of no value).
6. Need to make new assumption if any check points are not identical.

Student Work Activities

Frequent practice with accumulated orphaned and wrong font characters, or heads from school newspaper, under careful supervision of instructor.

UNIT EIGHTEEN: ORIGIN AND CLASSIFICATION OF TYPE FACES

Specific Objective

To teach the student to recognize the five basic designs of type faces which have evolved since the invention of movable types.

Suggested Studies

1. The five basic faces distinguished: Roman, Gothic, Italic, Text, Script.
2. Brief study of origin, characteristics and uses of each in present day printing.
3. Outstanding type designers including Gutenberg, Jenson, Manutius, Caslon, Bodoni, Garamond, Goudy.
4. Families of types.
5. Styles adopted by leading magazines, newspapers, textbook publishers, business firms.
6. Today's well-known type founders, including ATF, Stephenson Blake, Cornish & Wimpenny.

Student Work Activities

Clipping assignment wherein each student clips from newspapers and magazines several samples of each style which will be classified and mounted.

Brief notes prepared as study of styles progresses, these filed in notebook together with clipped samples.

Students required to refer to types by their exact family names during day-to-day work with them.

UNIT NINETEEN: BORDERING PROCEDURES

Specific Objective

To give practice in placing of borders and selection of space required for margins, gutters and setting measure.

Suggested Studies

1. Defining dimensions of stock to be used or area of advertisement.
2. Calculating amount of margins, gutters and setting measure.
3. Preference given to use of full em materials.
4. Addition of space to the type form to accommodate "squeeze" in lock-up.
5. Harmony of border in respect to type faces used.
6. Choice of mitering or butting borders.
7. Kinds of border material, including strip rule, linotype and piece borders.

Student Work Activities

Exercises of progressing difficulty embodying initial letters, inverted pyramids, etc., might be suitably bordered.

Opportunity for two-color work where an exercise may be carried to the point of presswork.

UNIT TWENTY: INTRODUCTION TO LAYOUT

Specific Objective

To introduce the student to typographical layout in order that he may gain an appreciation of the necessity for the careful planning of every job, and that he may develop skill in layout work.

Suggested Studies

1. The layout man, "the architect of the graphic arts industry;" his qualifications and duties.
2. Parallel with the work of the draftsman in other trades and industries.
3. Interpretation of the ideas and desires of the customer who must be satisfied.
4. Advantages of good layout.
5. Application of the principles of design.
6. Selling value of creative layout work.

Student Work Activities

Following instruction and practice in elementary layout work, the student will be required to prepare his own layouts in advance of jobs later attempted.

Practice in layouts for business cards, tickets, tags, letterheads, envelope corners, small display ad, etc.

UNIT TWENTY-ONE: LOCK-UP FOR THE PLATEN PRESS

Specific Objective

To teach the student accepted procedures of lock-up at the imposing stone.

Suggested Studies

1. Origin and function of the imposing stone.
2. Equipment associated with lock-up, including the type form, chase, quoins and key, reglets and furniture, planer and mallet.
3. Importance of correct lock-up.
4. Lock-up procedure for the square method and the chaser method.
5. How to test lock-up.
6. Remedies for faulty lock-up.
7. Planing the type form.
8. Safe storage of locked forms.
9. How to carry locked forms.

Student Work Activities

Following discussion and repeated demonstrations, the student will diagram the methods and write a step-by-step analysis of lock-up procedure, all to be preserved in notebook.

Student will practice lock-up with forms of various sizes and shapes until he has mastered the procedure to the point of readying a job for the platen press.

UNIT TWENTY-TWO: PLATEN PRESS FEEDING

Specific Objective

To give the student practice in feeding the platen press to the point where he can do so efficiently and safely.

Suggested Studies

1. Starting the press; stopping the press.
2. Use of the impression lever.
3. Placing and fanning pile of stock on feed table.
4. Feeding sheets accurately to gauge pins.
5. Unhurried rhythmic feeding, not in haste.
6. Alertness and safety consciousness paramount.
7. Interval checking for adequate inking.

Student Work Activities

The student will feed short runs of a variety of stock weights and sizes.

UNIT TWENTY-THREE: PREPARATION OF THE PLATEN PRESS FOR RUNNING

Specific Objective

To give the student practice in preparing platen presses for running.

Suggested Studies

1. Mounting rollers on the press.
2. Inking the press; care of ink in the can.
3. Checking packing and removing gauge pins; checking position of grippers, moving if necessary.
4. Trial impression and preliminary setting of pins and grippers.
5. Necessity of makeready techniques.
6. Final adjustment of packing, pins and grippers.
7. Instructor's approval of impression, margins, inking, etc., prior to actual run.
8. Press clean up procedures.

Student Work Activities

Under instructor's supervision, student will perform all the necessary operations in preparing a press for a new job, the instructor checking off each step as it is satisfactorily taken by student.

Student will be given several opportunities as time permits to prepare platen presses for live jobs to be run by himself or fellow student.

THE HISTORY OF THE
CITY OF BOSTON

By
JOSEPH NEALE

Author of "The History of the City of New York,"
"The History of the City of Philadelphia," &c.

NEW YORK:

JOSEPH NEALE, 10 NASSAU ST.

1850.

Entered according to Act of Congress, in the year 1850,
by JOSEPH NEALE, in the Clerk's Office of the District Court of the Southern District of New York.

Printed by J. NEALE, 10 NASSAU ST.

NEW YORK.

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Printed by J. NEALE, 10 NASSAU ST.

UNIT TWENTY-FOUR: MACHINE COMPOSITION

Specific Objective

To give the student an overview of modern machine composition methods for letterpress printing.

Suggested Studies

1. The "bottleneck" of hand composition in the graphic arts industry before the 1880's.
2. Mergenthaler's amazing invention and the revolution in the industry which ensued.
3. Machine composition by linotype making possible the present day production of books, magazines, newspapers, business forms, etc. by the letterpress process.
4. Comparative study of typesetting processes of Monotype, Ludlow and Elrod casting machines.

Student Work Activities

Brief notes prepared by student following class discussion and demonstrations.

Student may see the machines in the senior department of the graphic arts shop and have them demonstrated to him by a senior student or instructor.

If the machines are not in the school, a class visit may be arranged to a newspaper plant or commercial job shop where the student will get an insight into the operation of the casting machines, to the extent that the objective of the unit will be achieved.

UNIT TWENTY-FIVE: INTRODUCTION TO LITHOGRAPHY

Specific Objective

To give the student an understanding of the processes of offset lithography as compared with letterpress.

Suggested Studies

1. Root meaning of the term "lithography".
2. Discovery of the process by Senefelder.
3. Basic operating principle.
4. "Stone" lithography as originally practised.
5. Advent of photo lithography; very large part played by photography in the process today.
6. Offset lithography, the modern process.
7. Procedures from copy preparation to finished job; kinds of plates, the press, etc.
8. Discussion of the process as compared with letterpress printing.
9. Some advantages and disadvantages.
10. Recent phenomenal growth of offset lithography.

Student Work Activities

Participate in class discussions of the process.

Visit the lithography department of the school shop and observe senior students at work.

Visit a commercial plant specializing in lithography.

See films on the subject.

THE UNIVERSITY OF CHICAGO

CHICAGO, ILL.

DEPARTMENT OF CHEMISTRY

CHICAGO, ILL.

RECEIVED

APRIL 10, 1934

FROM

DR. J. H. HARRIS

CHICAGO, ILL.

TO

DR. J. H. HARRIS

CHICAGO, ILL.

RECEIVED

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UNIT TWENTY-SIX: INTRODUCTION TO BINDERY

Specific Objective

To introduce elementary basic techniques of bindery operations.

Suggested Studies

1. Calculating and cutting stock from ream size to press size.
2. Manual and machine jogging.
3. Perforating techniques.
4. Saddle and side wire stitching.
5. Padding gum application; the padding press.
6. Signature gathering and hand stitching as used in bookbinding.
7. Contemporary plastic and metal ring bindings.

Student Work Activities

Opportunity for student to cut, jog, perforate and stitch checking lists, memo pads, etc.

Student may pad and trim scratch pads, phone memos, etc., which he will make up from offcuts.

UNIT TWENTY-SEVEN: CAREER OPPORTUNITIES IN THE INDUSTRY

Specific Objective

To provide thought-provoking explanation of employment areas and advancement possibilities available to students of graphic arts.

Suggested Studies

1. Definition of work performed by such personnel as, compositor, pressman, binderyman, lithographer, and the many other capacities.
2. Apprentice training arrangements concerning wages, wage increase schedules, training time, attaining journeyman status.
3. The expectations of the employer re earnest effort, initiative, responsibility, courtesy, etc.
4. Advantages of the industry as regards working conditions, steady employment, etc.
5. The expanding future of this great industry.
6. Deportment when seeking employment.

Student Work Activities

Question and answer sessions in class.

Individual interview with instructor or representative of personnel department in a plant.

UNIT TWENTY-EIGHT: GRAPHIC ARTS TERMS

Specific Objective

To acquaint the student with terms peculiar to this field of work in order that he may understand and use the language of the industry.

Suggested Studies

1. The teacher will introduce the various terms peculiar to the industry as the year's work progresses, pronouncing, spelling and defining each as it occurs in day to day work.
2. Cumulative vocabulary list posted in prominent place with frequent reference to it.

Student Work Activities

The student will use the appropriate terms as the occasion or need arises during the year, adding them to his spoken and written vocabulary.

Towards the end of the year he will prepare a written glossary of the terms as a means of review of these additions to his vocabulary, and will file the glossary in his note folio.

Course Outline

for

GRAPHIC ARTS 22

COURSE OUTLINE FOR THE SECOND YEAR

Whereas the first year course is to a large measure exploratory by nature and design, none but the committed serious-minded achiever should be permitted to attempt the second year program. Standards of attainment will be such that the abilities of the best students will be challenged constantly. At the outset, it should be impressed on the student that only his sustained interest, best effort and genuine desire for accomplishment will suffice in this field. This is in keeping with the increasing demands of employers in the industry for apprentices of better than ordinary intelligence and mechanical ability and who demonstrate such traits as desire, enthusiasm, initiative, and responsibility, as well as proven skills and knowledge.

Every attempt should be made to discover the students' individual interests and special abilities and to develop these as far as possible. Although this three-year program offers a very broad experience in the graphic arts, and versatility is very desirable, specialization is the keynote of the industry today. Students who demonstrate marked interest and ability in such specialties as layout and design, copy preparation, darkroom techniques, composition, presswork, etc., should be encouraged to develop these skills. Especially in the third year the desire for specialization can be satisfied.

In addition, top-flight students particularly should be required to engage in research and experimentation. This may be carried out on an individual basis or in small groups. Findings will be reported in writing or orally to the class following such scientific investigation. Science is playing an ever increasing role in the entire field of graphic arts.

Production work that interferes with effective instruction should be avoided. The high school graphic arts shop is not a commercial printing plant. Exploitation will not be tolerated by the wise teacher.

CHECKLIST OF UNITS OF INSTRUCTION

1. Origin and development of printing from movable types
2. Evolution of the printing press, platen, cylinder, rotary
3. Principles of typographic design
4. Layout for letterpress and offset
5. Rule form composition
6. Display composition

7. Advanced platen presswork including automatic platen
8. Printing press rollers
9. Printing inks
10. Paper; paper making; printing papers
11. Paper cutting
12. Letterpress printing plates
13. Color register printing
14. Special letterpress operations
15. Bindery operations and machines
16. Thermography
17. The school newspaper
18. Rubber stamp making
19. Introduction to cylinder presswork
20. Elements of photography
21. Origin and development of lithography
22. Copy preparation for offset lithography
23. Introduction to camera work
24. Film processing
25. Film opaquing, corrections and additions
26. Layout and stripping
27. Platemaking
28. Offset presswork
29. Other duplicating processes for home, school or office
30. Apprenticeship in the graphic arts industry

UNIT ONE: ORIGIN AND DEVELOPMENT OF PRINTING
FROM MOVABLE METAL TYPES

Specific Objective

To outline the development of letterpress printing from the Gutenberg Era to the present day, and to develop in the student an appreciation of the accomplishments of pioneer printers in past eras.

Suggested Studies

1. Reproduction of the written word before the Gutenberg Era; manuscript books and bindings; woodblock engraving and printing; influence of the Renaissance.
2. Invention of movable metal types by Johann Gutenberg and associates; a lifetime endeavour; first printing of the Bible, a milestone in history.
3. Spread of printing throughout Europe; achievements of pioneers such as Schoeffer, Jenson, Manutius, Caxton.
4. First printing in English.
5. Introduction of printing to America.
6. Contributions of printers in colonial days, such as Daye, Green, Thomas, Benj. Franklin.
7. Pioneer presses, types, papers, inking methods.
8. Introduction of printing to Canada.
9. Printing comes to Alberta.
10. Honored place of the printing press in modern life.

Student Work Activities

1. The student will keep a record of class discussions to be filed in his notebook.
2. Library research assignments to individual students or small committees; oral and written reports.
3. Preparation of illustrative material by the offset process for distribution to class members.

UNIT TWO: EVOLUTION OF THE PRINTING PRESS, PLATEN, CYLINDER, ROTARY

Specific Objective

To give the student a knowledge of the phenomenal development of the printing press both mechanically and in its world-wide influence on mankind.

Suggested Studies

1. The upright wooden frame press of the Gutenberg Era.
2. Later improvements culminating in the press of the American Revolutionary period.
3. First all-metal upright presses after 1800; work of Earl of Stanhope, Geo. Clymer, Richard M. Hoe.
4. Early engine-powered presses; contributions of Isaac Adams, Geo. P. Gordon et al.
5. The modern Gordon style platen press.
6. Origin and development of the cylinder press; work of Nicholson, Koenig & Bauer, Applegath & Cowper for "The Times" of London; inventions of Napier, R. Hoe & Co.
7. Origin and development of the rotary press; first perfecting presses; first mats and stereos; work of Stanhope, Dellagana, Bullock, etc.
8. Today's well-known platen, cylinder and rotary presses; names and models of best-known makes.
9. Today's phenomenal production figures especially in newspaper, magazine and book publishing fields.
10. The influence of the press, past and present, on the progress of mankind, socially, educationally, politically, economically.

Student Work Activities

1. Industrial visits to local newspaper and commercial printing plants of great value and inspiration.
2. Class discussions on reports following research by instructor and students.
3. Carefully prepared outline notes with illustrative material gathered by students and reproduced by the offset method.

UNIT THREE: PRINCIPLES OF TYPOGRAPHIC DESIGN

Specific Objective

To develop in the student an appreciation of good typographic design, and to give him experience in the application of the principles of design in the layout and composition of his various jobs.

Suggested Studies

1. Typographic design, "the keynote of fine printing".
2. Basic principles of design reviewed including proportion, balance, dominance and subordination, unity, harmony, rhythm.
3. Modern practice and trends in typographic design.
4. Harmony among styles of type.
5. Suitability of type faces to jobs and papers.
6. The great worth of the layout artist in relation to the graphic arts industry.

Student Work Activities

1. Constant practice by the student in layout work, exemplifying his increasing appreciation of the underlying design principles.
2. Self-appraisal and class criticism of student work.
3. Critical examination and class discussion of printed material from various sources, past and present.
4. Student will hear talks on the subject of design by commercial or layout artists invited to visit the class from time to time.
5. Viewing of films and exhibitions depicting the fine art of printing.

UNIT FOUR: LAYOUT FOR LETTERPRESS AND OFFSET

Specific Objective

To give the student the opportunity to further his study and practice of typographic design in layout work.

Suggested Studies

1. Intensive study of seven points of formal typographical display.
2. Importance of the work of the layout man.
3. Meaning and application of the terms: thumbnail sketch, roughs, comprehensive layouts, paste-ups, dummies for letterpress and lithography.
4. Interpretation of copy to determine what parts to display.
5. How to mark-up for type composition.
6. "Modern" layout techniques.
7. Copyfitting for text matter (Introduction to)
8. Preliminary introduction to lithographic negative stripping.

Student Work Activities

1. Layout work in the second year will be an integral part of all forms of composition. The student will not proceed with type composition until he has produced acceptable comprehensive layouts for each proposed job.
2. Practice should include laying-out of title page of social program, business announcement, advertisement and other similar items.

UNIT FIVE: RULE FORM COMPOSITION

Specific Objective

To give the student experience in handling the composition of the various types of rule forms.

Suggested Studies

1. Use of quad rules, line rules, leaders and vertical leaders.
2. Monotabular (broach) work.
3. Use of work-and-move, work-and-turn and two-form styles of production.
4. Setting of independent units for column headings when using pen-ruled stock.
5. Rule forms produced by lithography and electrotypes.
6. Comparison of printing costs in choosing method of printing rule forms.

Student Work Activities

1. Students and instructor will collect examples of rule forms, such as: deposit slips, time sheets, shipping orders, invoices, estimate sheets, customs forms, etc. These can be critically examined for accuracy of register and to determine methods employed in setting them up.
2. Each student will set and prove at least one good example of the single and double types of rule forms, in addition to registering headings to pen-ruled stock.

UNIT SIX: DISPLAY COMPOSITION

Specific Objective

To give the student an understanding of the wide range of display work in the advertising field today.

To give the student practice in display composition.

Suggested Studies

1. Critical study of many examples of display work brought to class by teacher and students, such as window cards, posters, sale notices, handbills and large advertisements from current magazines and newspapers.
2. Need of letterspacing large type.
3. Techniques of underlining, bordering and use of ornaments.
4. Decisions concerning color separation.
5. Range of sizes and kinds of stock used for posters to establish margins and setting measure.
6. Press problems concerning lock-up, ink density, "ghosting", double-roll inking and right side of stock.

Student Work Activities

1. Rough layouts sketched on newsprint to give practice in effective arrangements of various elements used in display.
2. An individual project by each student. Suggestions:
 - a. A sport or travel poster of size about 11"x14" to include an illustration (possibly lino cut) and type matter ranging in sizes from 24 pt. to 20-line wood type.
 - b. Handbills or posters to promote school events such as operetta, plays, social events, or to promote school newspaper and yearbook.

UNIT SEVEN: ADVANCED PLATEN PRESSWORK
INCLUDING THE AUTOMATIC PLATEN

Specific Objective

To give the student a thorough knowledge of the platen press, hand-fed and automatic, and to render him a proficient operator thereof.

Suggested Studies

1. Principle of the platen press.
2. Part of the press and function of each.
3. Dressing the platen and make-ready techniques.
4. A preview of special operations associated with the platen press.
5. Setting margin allowances for automatic Heidelberg and Kluge presses.
6. Press maintenance.
7. Safety precautions.

Student Work Activities

1. Each student will be encouraged to make good use of every opportunity afforded him to broaden his experience with the platen presses in the shop.
2. His mastery of the skills of the pressman will come through much practice in setting up and running a variety of forms, which will include his share of school production work, assigned exercises, and so on.
3. He will keep a record in his note folio of his press jobs with samples of his finished work.

UNIT EIGHT: PRINTING PRESS ROLLERS

Specific Objective

Examination of methods and principles involved in the manufacture and care of press rollers.

Suggested Studies

1. Components of composition, rubber and plastic rollers.
2. Care of operating rollers in respect to gudgeons, protective bearers, nibs, etc.
3. Storage of rollers, temporary and long term.
4. Effects of humidity, temperature and shrinkage in performance of rollers.

Student Work Activities

1. In conjunction with presswork assignments, student will test gudgeon-roller relation for platen press operation and journal box settings of automatic presses.
2. He will thoroughly learn and practice the routine procedures of cleaning rollers and storage at the conclusion of each press run.
3. He will practice the use of bearers, or at times remove rollers from press to protect them, when running jobs which tend to shorten the life of the rollers, such as line rule forms, scoring, perforating and die cutting.

UNIT NINE: PRINTING INKS

Specific Objective

To give the student a knowledge of the composition of printer's inks and experience in using them.

Suggested Studies

1. Early development of inks.
2. Present day ink making ingredients and methods.
3. Kinds of inks now in use by the printer.
4. Fitting inks to papers.
5. Mixing colored inks; tints and shades.
6. Handling of gold and silver inks.
7. Care of inks in and out of use.
8. Virkotype inks for thermography.

Student Work Activities

1. The student will come to realize that each time he inks up a press for a job at hand, he is confronted with the problem of a choice of ink for that particular job, paper and type of press.
2. He will practice accepted procedures in inking a press, how to remove ink from the can, how much to use, how to re-ink during run, etc.
3. He will have practice in mixing inks for lighter tints of colors, mixing gold inks, etc.
4. He will undertake some research study into ink chemistry and manufacture.

UNIT TEN: PAPER; PAPER MAKING; PRINTING PAPERS

Specific Objective

To interest the student in this essential commodity; its origin, manufacture and uses, and especially to develop in the student an appreciation of fine papers as used by the printer.

Suggested Studies

1. Paper, "the modern day miracle."
2. Chinese origin of paper; differentiate papyrus, parchment and paper.
3. Early handmade papers; their printing qualities.
4. Beginnings of machine-made papers; contributions of Louis Robert, Fourdrinier brothers, Reaumur, Kellar, Burgess, Tilghman.
5. Modern paper making; raw materials, processes and machines.
6. Classifications of printing papers by content, size, weight, color, use.
7. How to figure stock for printing jobs.
8. Annual production figures for papers and paper products in America; in Canada.
9. Paper specialities in everyday use.
10. Mass packaging and mass shipping with paper products.

Student Work Activities

1. Take part in class discussions; make notes.
2. View films on paper making and discuss same.
3. Research assignments and reports.
4. Prepare sample books of papers; classify them.
5. Learn to recognize papers by sight, touch, sound.
6. Use papers for specific jobs; fitting paper to job.

UNIT ELEVEN: PAPER CUTTING

Specific Objective

To develop in the student an understanding of the mathematics of computing stock requirements to encompass press feeding and final trimming.

Suggested Studies

1. Mill sizes of commonly used stocks.
2. Computing maximum "out-of-stock" segments.
3. Value of including trim-off area during press feeding and bindery operations.
4. Exact size division techniques.
5. Mill-edge **trimming**.
6. Feed-edge importance.
7. The paper cutter; its operating parts, capacity, safety features.

Student Work Activities

1. Stock cutting experiences utilizing various kinds and sizes of stock following which press-work and bindery operations will be carried through to finished product.
2. The student will learn to observe all safety precautions on this potentially dangerous machine.

UNIT TWELVE: LETTERPRESS PRINTING PLATES

Specific Objective

To give the student a knowledge of photo-engraving techniques and other methods of producing letterpress printing plates, and to give him practice in printing involving the use of plates.

Suggested Studies

1. Great use of illustration in modern printing.
2. The photo-chemical process of line engraving.
3. Halftone engraving; fitting screens to papers.
4. Electrotyping.
5. Stereotyping.
6. Wood, linoleum, rubber, Dycril plastic plates.
7. Special problems of makeready frequently encountered when running "cuts".
8. Mounting materials.

Student Work Activities

1. Whenever possible the student will mount or use plates mounted type high in press assignments.
2. Prepare notes on engraving processes. Collect and file with notes examples of line and halftone illustrations, as well as reproductions from other types of plates.

UNIT THIRTEEN: COLOR REGISTER PRINTING

Specific Objective

To acquaint the student with the fine-line register requirements when printing with more than one color.

Suggested Studies

1. Color separation of forms and/or plates.
2. Lock-up techniques for letterpress or register setting for offset presswork.
3. Importance of feed edges.

Student Work Activities

1. Assignment of exercises requiring color division in which close register is imperative. In this regard, exercises might include multiple rule borders, typographic ornaments, two-color engravings and plates in which register of colors is quite critical.

UNIT FOURTEEN: SPECIAL LETTERPRESS OPERATIONS

Specific Objective

To acquaint the student with the further versatility of the platen press through practice with certain special operations not common to the usual printed form.

Suggested Studies

1. Discussion regarding the features of certain jobs beyond the printing of type matter, including:

(a) Perforating	(e) Die Cutting
(b) Numbering	(f) Panelling
(c) Scoring	(g) Embossing
(d) Cutting	(h) Frisketing
2. Perforating rules and tapes.
3. Versatility of numbering machines, i.e., skip, reverse, forward, letter plungers.
4. Assembly and care of numbering machines.
5. Modern practice of frisketing number plunger from jobs.
6. Examination of many examples collected by students.

Student Work Activities

1. Use made of 1(a), 1(b), 1(c) in the course of the production of tickets, programs, menus, etc., for the use of the school.
2. Certain interested students may do some experimental work with some of the other operations listed, such as: die cutting round corner cards, coasters, small boxes, place cards, etc., or panelling an invitation.

UNIT FIFTEEN: BINDERY OPERATIONS AND MACHINES

Specific Objective

To provide the student with an acquaintance with the follow up activities to press operation, the machines and other equipment of the bindery, and to unfold employment possibilities in the bindery trade.

Suggested Studies

1. Hand folding with bones.
2. Machine folding and tipping-in.
3. Collating by hand and machine.
4. Setting of gates and gauges preparatory to drilling, slotting and round cornering.
5. Changing and setting stitcher for flat and saddle-back stitching.
6. Safety considerations in the bindery.
7. Modern techniques of bindings of plastic, wire, posts, and the like.

Student Work Activities

1. An extension of bindery exercises following up the experiences of the first year, giving the student as much practice as possible with all available equipment and machines.
2. The student will share the responsibility for maintenance of this equipment.
3. The student will learn to appreciate the necessity for cleanliness and good housekeeping in the bindery and will share the work here.

UNIT SIXTEEN: THERMOGRAPHY

Specific Objective

To give student practice in the application of the Virkotype process for "raised printing" effects.

Suggested Studies

1. Understanding the term, thermography and basic chemistry of the process,
2. Comparison with the more expensive methods of copperplate engraving and embossing.
3. Machines used for quantity production.

Student Work Activities

1. Working in groups of two or three, students will "Virkotype" short runs of cards, letterheads, monogrammed stationery or greeting card.
2. Two-color job may be attempted.

UNIT SEVENTEEN: THE SCHOOL NEWSPAPER

Specific Objective

To give the students the most complete experience possible in the printing of a school newspaper.

Suggested Studies

1. Understanding "style" of school paper in regard to heads, makeup, mastheads, folio treatment, continuations, etc.
2. Choice of typefaces and type sizes depending on content of articles.
3. Fitting proofs to make paste-up layouts from the editorial dummies.
4. Imposition of type into columns with regard to cut offs, dashes, jumping from column to column and from page to page.
5. Computing and cutting stock.
6. Lock up of forms and press operations.
7. Order of printing to permit drying and jogging.
8. Folding, gathering and packaging.

NOTE: It is recommended that the editorial and business staffs of the school paper be organized outside the graphic arts department, thus affording a fine opportunity for the correlation of the work of the students of printing with the English, Business Education and other departments of the high school.

It should be emphasized that the finished paper should be wholly the result of student effort, with the graphic arts instructor offering guidance and directing production. Other teachers must be enlisted to act in a like capacity as regards the editorial and business ends of the project.

Student Work Activities

Crews of students will be appointed to handle (a) layout and makeup, (b) lockup and jogging, (c) stock cutting and presswork, and (d) folding, gathering and packaging. These four operations will proceed simultaneously, each group cooperating with the others in order that publication can be accomplished with a minimum of delay. Crew personnel should be changed with each issue in order that all will be afforded practice in the various areas of production.

UNIT EIGHTEEN: RUBBER STAMP MAKING

Specific Objective

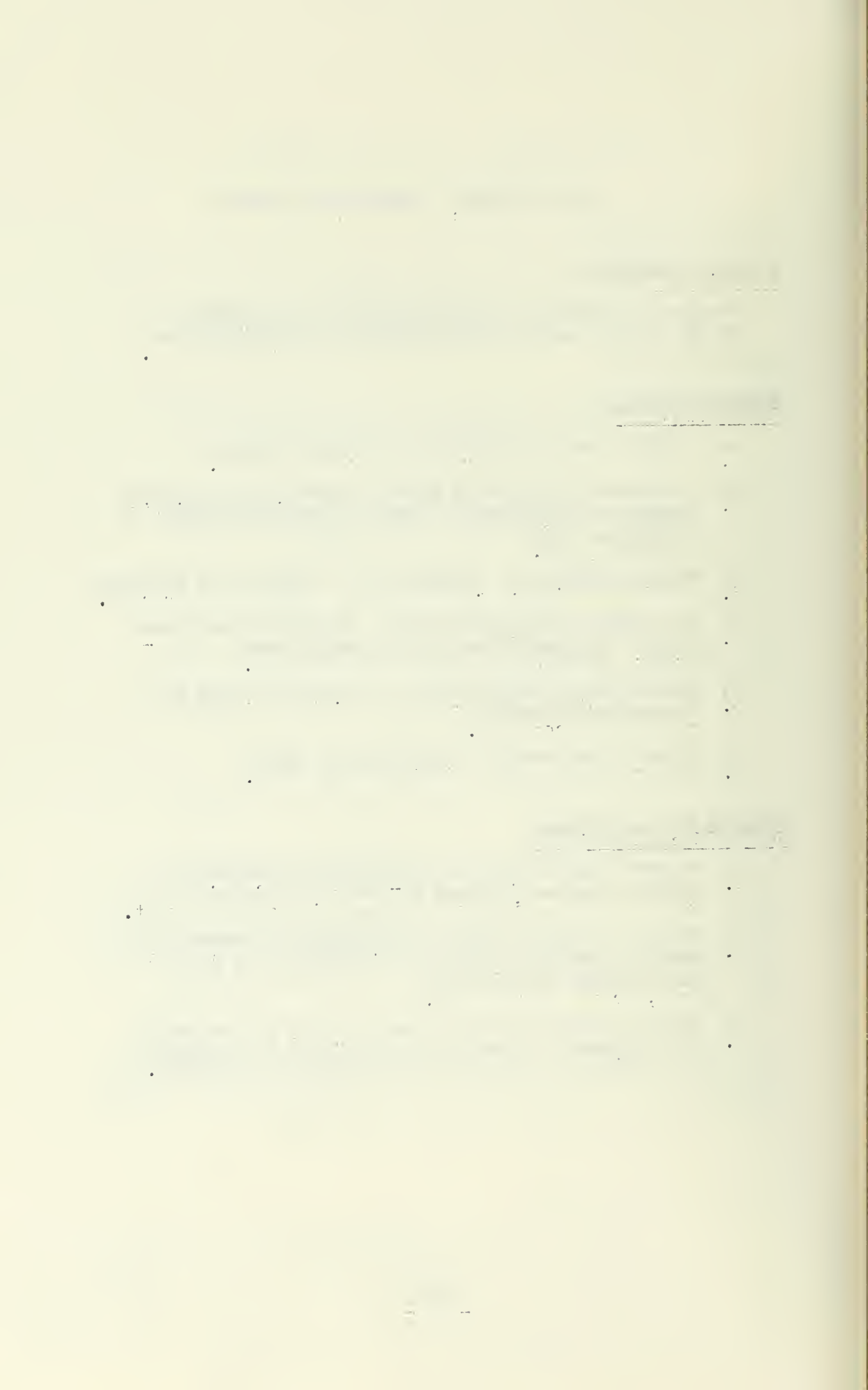
To give the student an understanding of the rubber stamp process and to develop skill in carrying it out.

Suggested Studies

1. Today's very extensive use of rubber stamps.
2. Particular function of rubber plates in the printing industry for continuous forms, corrugated board packaging, etc.
3. Matrix materials; chemistry of; function in process.
4. The rubber vulcanizing press; its action and controls; gauging of matrix and stamp beds.
5. Understanding and practice of critical timing and temperature controls.
6. Rubber stamp mounts; inking pads; inks.

Student Work Activities

1. Student will learn the step-by-step procedure for rubber stamp making that success will always result.
2. Student will gain skill in handling the process by making up stamps to be put into actual use in the home, school or business.
3. Student will learn the proper care of the materials and equipment in order to avoid waste or accident.



UNIT NINETEEN: INTRODUCTION TO CYLINDER PRESSWORK

Specific Objective

An introduction to the preparation, operation and maintenance of larger presses.

Suggested Studies

1. Chase and lockup requirements in relation to grippers and margins.
2. The value of "trim" allowance in cutting stock.
3. Setting of register gauges, feeder shoes and delivery guides.
4. Oiling and greasing requirements.
5. Positioning of ink rollers.
6. Ink fountain settings.
7. Safety and automatic stop controls.
8. Starting and running controls.
9. Make-ready techniques.
10. Post-presswork adjustments and clean up.

Student Work Activities

1. The student will take advantage of every opportunity to cut stock, lock up, set up and operate the cylinder press. The school paper is one of several items which will provide experience.
2. The student will make up pertinent notes on the cylinder press and file samples of the jobs which he has run.

UNIT TWENTY: ELEMENTS OF PHOTOGRAPHY

Specific Objective

To introduce photography to the student to the point that he will understand the basic materials and processes.

Suggested Studies

1. History of photography to bring out briefly the contributions of pioneers such as Davy and Wedgwood, Daguerre, Morse, Brady, Talbot, Niepce, Archer, Bennett and Eastman.
2. Essential place of photography in modern life and industry.
3. Structure and chemistry of photographic film; bases, emulsions; common types esp. ortho- and panchromatic.
4. Operating principle of the camera, simple or complex.
5. Darkroom equipment and layout.
6. Film processing; chemicals, their function and care, developer, stop bath, "hypo" fixer; washing and drying.
7. Print papers, kinds and processing.
8. Contact printing.
9. Importance of cleanliness in all photographic work.
10. Role of photography in the printing industry.
11. Photography as a hobby.

Student Work Activities

1. Contribute to the discussion of photography, its origin, development and present important role.
2. Observe demonstrations of film processing and print making.
3. Make some contact prints from own negatives.
4. Keep notes on discussions, demonstrations, practice work.
5. View film shows supplied by photo supply firms.

UNIT TWENTY-ONE: ORIGIN AND DEVELOPMENT OF LITHOGRAPHY

Specific Objective

To acquaint the student with the evolution of lithography since its inception before 1800 to the end that he will more fully understand and appreciate offset lithography as it is practiced today.

Suggested Studies

1. Discovery and initial applications of the process by Senefelder beginning about 1796; basic principle.
2. Development of "stone" lithography to 1900; excellence of the work, eg. Currier and Ives.
3. Beginnings of "plate" lithography; early presses.
4. Photo "offset" lithography; its phenomenal rise since 1905 and more especially since World War II.
5. Important role of photography; types of film used.
6. Lithographic plates; zinc, aluminum, paper masters; pre-sensitized plates; deep etch plates.
7. Competitors, lithography vs letterpress; advantages and disadvantages of each.
8. The future of lithography.

Student Work Activities

1. Participate in class discussion and research.
2. Prepare illustrated outline notes on the subject.
3. Critical examination of printed and lithographed materials to develop judgment of quality in each.
4. Visit commercial plant specializing in lithography.

UNIT TWENTY-TWO: COPY PREPARATION OF OFFSET LITHOGRAPHY

Specific Objective

To develop in the student skill in preparation of camera copy to the degree that his work will be acceptable for photographic reproduction.

Suggested Studies

1. Two kinds, viz., line copy and halftone copy.
2. "Repro proofs" of type matter and engravings.
3. The reproduction proof press.
4. Hand lettering with pen or brush and ink.
5. Pen and ink drawings of business forms, maps, graphs, cartoons, etc.; almost limitless possibilities; premium on skill and creativeness of layout artist.
6. Clipped copy; ethical procedures; copyright laws.
7. Figuring reductions and enlargements.
8. Methods of correction in camera copy.
9. Halftone copy including photographs in black and white, paintings, brush and air-brush renderings.
10. Layout and make-up procedures.

Student Work Activities

1. Student will prepare some examples of line copy.
2. He will develop skill as a result of much practice in pen and ink and brush rendering.
3. Pull repro proofs on reproduction proof press or from locked forms in platen press.
4. Assemble proofs and/or art work into paste-ups with better than ordinary accuracy.
5. Self-appraisal and critical examination of work of others to help in setting standards of excellence.

UNIT TWENTY-THREE: INTRODUCTION TO CAMERA WORK

Specific Objective

To acquaint the student with the lithographer's copying camera and to develop elementary skills in its operation.

Suggested Studies:

1. Two types, the darkroom camera and the gallery camera.
2. Organization of the darkroom for efficient use.
3. Main camera parts; copyboard, lights, lens, ground glass, vacuum back film holder, bellows, etc.
4. Operating controls: lights, focus, f-stop settings, exposure timing, same size and reduction-enlargement settings, vacuum pump, Waterhouse stop.
5. Ortho film handling and storage; safelighting.
6. Camera maintenance and care; safety considerations particularly with arc lamps.
7. Procedure in shooting line copy.
8. Theory of the halftone screen; screening procedure for halftone copy; basic and flash exposures.
9. Overcoming problems of static and dust around camera.

Student Work Activities

1. Observe demonstrations of the camera parts, controls.
2. Practice operating camera settings without film.
3. Using copy and film shoot line copy same size.
4. Shoot reductions and enlargements of line copy, making necessary readings and calculations for changes in focus, lighting, etc.
5. Shoot an example of halftone copy, same size using contact screen.
6. Observe all necessary precautions of safelighting, film handling, film storage, cleanliness, etc.
7. Keep good notes and drawings on camera operation.

UNIT TWENTY-FOUR: FILM PROCESSING

Specific Objective

To give the student practice in approved procedures of developing, stopping, fixing, washing, drying film.

Suggested Studies

1. Review chemistry of film, especially emulsion characteristics of orthochromatic films.
2. Safelighting and film viewing arrangements.
3. Arrangement of film developing sink; water supply; sequential order of trays.
4. Chemicals used; preparation of; keeping qualities and storage.
5. Importance of cleanliness in wet darkroom.
6. Temperature controls.
7. Recommended timing requirements of various baths.
8. Film handling techniques especially in developer; need for thorough fixing and washing.

Student Work Activities

1. Student will pay strict attention to approved procedures as demonstrated by the instructor, and take part in discussion of same.
2. He will mix chemicals and measure out required quantities for immediate use.
3. Student will practice actual development of film observing all rules for timing, temperature, agitation.
4. Similarly, he will stop, fix, wash and dry his films.
5. Each student who uses the facilities of the darkroom will help to maintain strict cleanliness therein at all times.
6. Pertinent notes and diagrams filed in notebook.

UNIT TWENTY-FIVE: FILM OPAQUING, CORRECTIONS AND ADDITIONS

Specific Objective

To develop skill in the handling of tools and materials used in improving the quality of processed film previous to platemaking.

Suggested Studies

1. Causes of imperfections in processed film such as pinholes and weakness in opacity, fuzziness of image, etc., and how to avoid them.
2. Red opaque; how to opaque; care of brushes.
3. Changes in film emulsion for corrections, alterations and additions.
4. Use of emulsion scribes for ruling tabular forms, graph grids, etc., directly on line negatives.
5. How to handle film to avoid scratches, finger prints or other disfigurements.

Student Work Activities

1. The student will critically examine his processed film for imperfections and carry out opaquing where necessary.
2. He will learn how to handle film in order that the emulsion will not be damaged.
3. He will practice the use of scribes and other instruments or materials employed in modifying image features previous to platemaking.

UNIT TWENTY-SIX: LAYOUT AND STRIPPING

Specific Objective

To acquaint the student with the materials and methods incident to preparing flats and to give him practice in their preparation.

Suggested Studies

1. Equipment and supplies used by the photolithographic stripper.
2. Goldenrod masking paper used for flats.
3. Layout table and accessories.
4. Materials and methods of fastening negatives to flats; cutting out windows.
5. Stripping line negatives; cutting in marks for the platemaker; trim, fold and cut marks.
6. Stripping halftone negatives.
7. Making up combination line and halftone flats.
8. Positive and reverse lettering over halftones.

Student Work Activities

1. The student will develop skill in layout and stripping up flats as he thus prepares his negatives for subsequent platemaking.
2. He will severely criticize his own work, compare it with the work of others and strive for high standards of accuracy at all times.

UNIT TWENTY-SEVEN: PLATEMAKING

Specific Objective

To develop knowledge and skill in lithographic platemaking using presensitized aluminum plates and paper masters.

Suggested Studies

1. Elementary chemistry of platemaking.
2. Chemicals required; handling and care.
3. The platemaker; its parts and controls.
4. Imposing flat on the plate.
5. Burning the plate.
6. Developing the plate with desensitizer and lacquer; following instructions of the manufacturer.
7. Gumming the plate to prevent oxidation.
8. Causes of plate failures.
9. Minor plate deletions, additions or corrections.
10. Preparing paper masters; pencil, pen and ink, typewritten, pre-printed images.
11. Direct-image plates; deep etch plates; Xerox plate images.

Student Work Activities

1. Using his own negatives, the student will prepare plates for presswork.
2. He will prepare paper masters for short runs, experimenting with the various media for image.
3. Carefully written notes will be kept.

UNIT TWENTY-EIGHT: OFFSET PRESSWORK

Specific Objective

To introduce the student to the offset press and to develop in the student elementary skills in its operation.

Suggested Studies

1. The single-color offset press; basic nomenclature.
2. "Offset" operating principles.
3. Functions of plate, blanket, impression and impression cylinders.
4. The inking system.
5. The dampening mechanism.
6. Feeding and delivery systems.
7. Operating controls; sequence of same.
8. Installing and removing plates; impression.
9. Adjustments for margin control.
10. Offset inks and papers.
11. Care of press; wash-up; lubrication.
12. Safety considerations.

Student Work Activities

1. Observe a series of sequential demonstrations of press operation; make illustrated notes.
2. Practice operating controls for starting and stopping, fountain, ink, suction, feeding.
3. Practice installing plates, ink, fountain solution, stock, oiling, wash-up.
4. Completely prepare press for actual run of own jobs, thus completing the series of steps in the lithographic process.
5. Learn all possible about lithographic presses, single and multi-color.

UNIT TWENTY-NINE: OTHER DUPLICATING PROCESSES
FOR HOME, SCHOOL OR OFFICE

Specific Objective

To acquaint the student with other duplicating processes apart from letterpress printing and lithographing for home, school and office.

Suggested Studies

1. "Hektograph" gelatin open tray process; preparation of chemicals and copy; pulling short runs of prints.
2. Spirit duplicators; range of copy possibilities; operating principle.
3. "Mimeograph" style duplicator; short and long run stencils; how to cut stencils with stylus or typewriter; hand and motor powered models.
4. Drafting printmakers; Diazo, ozalid, blueprint reproduction.
5. Electronic office copying machines.

Student Work Activities

1. Visit school office or business education machine rooms to observe duplicators in use.
2. Visit school's drafting department to see print making from pencil and ink tracings.
3. Prepare a hektograph refill and experiment with duplication from it.
4. Prepare simple examples of copy for spirit and mimeo duplicators and see a few prints run from them by office staff or business education students.

UNIT THIRTY: APPRENTICESHIP IN THE GRAPHIC ARTS INDUSTRY

Specific Objective

To investigate employment-while training opportunities within the sphere of printing and allied trades; to single out a specific preference and to lend guidance to vocational planning.

Suggested Studies

1. "Escalation" of wages paid to the apprentice
2. Contract of apprenticeship.
3. Period of apprenticeship; upgrading for demonstration of knowledge and skill acquired at school.
4. Study demands upon the apprentice.
5. Application procedure.
6. Universality of the graphic arts industry, stability of the industry; multiplicity of job opportunities.

Student Work Activities

1. The student will participate in class discussion of vocational possibilities of all facets of the graphic arts.
2. Students will hear from representatives of employers' groups and apprenticeship boards who are invited in from time to time to speak to the classes and to answer questions.
3. Students will be encouraged to visit commercial printing plants to interview personnel regarding the various aspects of the industry.

Course Outline

for

GRAPHIC ARTS 32

CHECKLIST OF UNITS OF INSTRUCTION

1. Comparative study of the three printing processes involving the use of plates
2. Great names in the history and development of the graphic arts industry
3. Basic operations of casting machines
4. Copy-fitting and mark-up
5. Page imposition and lockup
6. Advanced presswork
7. Intaglio printing (gravure)
8. Screen process printing
9. Folding box cutting and printing
10. Xerography and xeroprinting
11. Advanced darkroom practices
12. Advanced layout and design
13. Advanced copy preparation for offset lithography
14. Copy-producing typewriters
15. Photo composition
16. Color process printing
17. Bookbinding
18. Modern packaging
19. Costing and job estimating
20. The future in the graphic arts industry

UNIT ONE: COMPARATIVE STUDY OF THE THREE PRINTING
PROCESSES INVOLVING THE USE OF PLATES

Specific Objective

To give the student a clear understanding of the distinctive basic principles of relief, planographic and intaglio printing processes.

Suggested Studies

1. Review of the origin and development of the three processes.
2. Characteristics of each:
 - a. Relief - letterpress
 - b. Planographic - lithography
 - c. Intaglio - gravure
3. Comparative study of the advantages and disadvantages of the processes.
4. What of their future?

Student Work Activities

1. Diagrammatic representation of the three processes.
2. Research assignments on development of the processes, particularly in the 20th century.
3. Outline notes covering research and discussion.
4. Critical examination of examples of work produced by each process.

UNIT TWO: GREAT NAMES IN THE HISTORY AND DEVELOPMENT
OF THE GRAPHIC ARTS INDUSTRY

Specific Objective

To acquaint the student with the contributions of the great pioneers in the graphic arts and to develop an appreciation for the parts they played in the phenomenal development of the industry.

Suggested Studies

1. Works of such as:

Johann Gutenberg	Alois Senefelder
William Caxton	Earl of Stanhope
Nicholas Jenson	John Walter I, II, III
Juan Pablos	Koenig and Bauer
Stephen Daye	William Bullock
Samuel Green	Richard M. Hoe
Benjamin Franklin	George P. Gordon
John Bushell	Currier and Ives
Pierre Fournier	Harris Bros. and Rubel

2. Type designers, such as:

Nicholas Jenson	Claude Garamond
Aldus Manutius	William Caslon
Giambattista Bodoni	John Baskerville
Christopher Plantin	Frederic Goudy

3. Others in associated fields, such as, photography, paper-making, engraving, etc.

Student Work Activities

1. Research assignments and class reports.
2. Participation in class discussions on the significant contributions of pioneers, inventors, designers.

UNIT THREE: BASIC OPERATIONS OF CASTING MACHINES

Specific Objective

To familiarize the student with the mechanical principles and specific machines used to cast type and composing materials.

Suggested Studies

1. Preparation and/or assembly of molds or matrices.
2. Examination of heat requirements at crucible and mouthpiece; followed by cooling device prior to ejection.
3. Distribution and/or dismantling of molds and matrices.
4. Change-over adjustments to provide full scope of casting machines.
5. Comparison of alloy components as suited to different casting devices.
6. Comparative study of:
 - a. Manual casting - stereotype caster
 - b. Automatic strip casting - Elrod, Monotype and Universal.
 - c. Semi-automatic type casting - Ludlow, Nebitype and Monotype.
 - d. Automatic type casting - Linotype and Intertype.
 - e. Tape-fed type casting - Teletypesetter and Monotype.

Student Work Activities

1. An appointed span of time should be provided for student to prepare, operate and practice maintenance on all casting devices.

UNIT FOUR: COPY-FITTING AND MARK-UP

Specific Objective

To link the knowledge of type styles and sizes with layout practice.

Suggested Studies

1. Character counting to establish the space copy will occupy with given kind and size of typeface.
2. Calculation of amount of copy required with selected typeface to fill space allotment.
3. Using the commercially prepared copy-fitting charts.
4. Mark-up procedure to indicate measure, point size, body size and kind of typeface for hand and machine composition.
5. Mark-up techniques for special paragraphing effects, in combination with illustrations, for photographic blow-up or reduction and "cold-type" machines.

Student Work Activities

1. In conjunction with layout exercises, student should copy-fit text material as well as display type for advertising brochure, book pages, newspaper advertisements and proofs for lithographic reproduction, etc.
2. Where possible, actual follow through in setting type, makeup, etc., should be performed using the instructions indicated in students' own mark-up of copy.

UNIT FIVE: PAGE IMPOSITION AND LOCKUP

Specific Objective

To acquaint the student with preparations and calculations necessary to produce multi-form presswork.

Suggested Studies

1. Folding a "dummy" to assign pages to position.
2. Calculation of margins and gutters size stock.
3. Desirability of trim allowance.
4. Types of imposition:
 - a. Sheetwise
 - b. Work-and-turn
 - c. Work-and-tumble
5. Stone-lay for 4-, 8-, 16-page signatures.
6. Back margin increase for outside sheets.
7. Imposition procedure applicable to stripping page negatives for lithography.

Student Work Activities

1. Imposition and lockup practice in the various styles, using imitation page forms.
2. Press run a few copies of locked forms, followed by trimming, folding, etc., to check against original stone-lay and dummy.
3. Pencil diagrams preserved in notebook.

UNIT SIX: ADVANCED PRESSWORK

Specific Objective

To explore more intricate production problems in all styles of presswork.

Suggested Studies

1. Bleed-off, tinting, overprinting techniques.
2. Multi-page signature printing.
3. Gold, silver and metallic inks.
4. Magnetic ink character recognition uses.
5. Printing on cellophane, acetate and polyethylene materials.
6. Trouble shooting for impression, register, inking and mechanical faults.
7. Combatting "set-off" with sprays and heat.

Student Work Activities

1. Actual opportunity to engage in all phases of advanced presswork will necessarily not be possible for all members of the class. Study and discussion may have to suffice, particularly in the trouble shooting field.
2. However, certain students of marked ability and special interest may be permitted to specialize to a considerable degree in presswork to the extent that they develop very considerable saleable skills and knowledge.

UNIT SEVEN: INTAGLIO PRINTING (GRAVURE)

Specific Objective

To give the student an understanding of the gravure process and of copperplate engraving.

Suggested Studies

1. Meaning of the term "intaglio".
2. Basic principle of intaglio.
3. Other terms applied to this process: gravure, roto-gravure, photogravure, copper and steel engraving.
4. How copper and steel plates are engraved and printed; types of fine work done.
5. Steps in preparation of the rotogravure press cylinder; the gravure screen.
6. How the gravure press operates; inking system.
7. Advantages and disadvantages of rotogravure.
8. Types of work most commonly done.
9. Dry point etching, procedure, equipment, supplies.

Student Work Activities

1. Participate in class discussion of the process.
2. Each student will prepare a suitable design for a dry point etching, and following the hand process through, produce a few copies.
3. Industrial visit to a copperplate engraving or rotogravure plant in neighborhood.

UNIT EIGHT: SCREEN PROCESS PRINTING

Specific Objective

To introduce the student to the screen process and to develop skill in the operation of hand silk screen equipment.

Suggested Studies

1. Basic principles of silk screen printing.
2. A fine art in the hands of the expert.
3. Versatility of the process as regards surfaces which may be printed.
4. Basic equipment requirements: the frame, silk screen, squeegee, stencil film, knives, chemicals.
5. Colors and color mixing.
6. Procedures for making screen prints in classroom by the (a) Paper stencil method, (b) Tusche and glue, (c) Lacquer film, (d) Reverse color.
7. Multi-color screening.
8. Safety precautions for handling chemicals.
9. Photographic stencil-making techniques.
10. Recent developments in the commercial screen printing field.
11. Dye transfer printing of color work.

Student Work Activities

1. Students may build printing frames for own use.
2. Prepare suitable designs for single color screen job; for multi-color jobs.
3. Experiment with the various screen methods.
4. Screen designs on a variety of materials, such as: paper, cloth, wood, plastic, glass, sheet metal.

UNIT NINE: FOLDING BOX CUTTING AND PRINTING

Specific Objective

To study composition items, assembly and presswork entailed in making various types of folding boxes.

Suggested Studies

1. Bending the cutting and scoring rules.
2. Jig-sawing plywood form parts.
3. Push out devices.
4. Size and strength requirements for clothing, chinaware, foods, etc.
5. Cornering and locking tabs.
6. Printing form positioning of top, sides, ends.

Student Work Activities

1. Samples of folding boxes for various items should be obtained and labelled as to use and size.
2. Assembly of rules and plywood parts should be performed for various sized items, with the student designing and setting the printed portion to match. In this field production will seldom be required for school use but a practice form that is adjustable will acquaint student with all phases except actual press performance.
3. Industrial visit to a plant with this specialty.

UNIT TEN: XEROGRAPHY AND XEROPRINTING

Specific Objective

To give the student an understanding of xerography and its increasing role in the printing industry.

Suggested Studies

1. Meaning of the term "xerography".
2. Twofold principle:
 - a. Photoconductivity
 - b. Triboelectric effect
3. Preparation of sensitized photoconductive plates.
4. Plate development for mirror-reversed positive.
5. Making of permanent prints.
6. Xerocopying services available to the public.
7. Xeroprinting machines on the market.
8. Future of the process.

Student Work Activities

1. Search out and study all available information on the subject of xerography.
2. Use offset metal plates and paper masters prepared by the xerographic process.
3. Visit a local plant operating this equipment.

UNIT ELEVEN: ADVANCED DARKROOM PRACTICES

Specific Objective

To give the student the opportunity to broaden his knowledge and to increase his skill in darkroom activities associated with photography and lithography.

Suggested Studies

1. Chemistry of photographic film: ortho, pan, infra-red; black and white, color; emulsions, etc.
2. Photo printing by enlargement; by contact; papers in common use.
3. Use of filters.
4. Advanced study of photo and litho chemicals.
5. Advanced study and practice in halftone work with contact screens; autoscreen film; use of reflection density guide, exposure computer, etc.
6. Layout and stripping of more intricate forms, line and halftone.
7. Increased knowledge and skill in platemaking; paper, zinc, pre-sensitized aluminum; deep-etch plates.
8. Color separation for offset reproduction purposes.
9. Densitometry.
10. Photography as a leisure-time pursuit.

Student Work Activities

1. Ample time should be available in this third year for such concentrated study and practice that the apt student will develop saleable knowledge and skills in this specialized aspect of lithography.
2. Students who show intense interest and marked ability may be afforded the opportunity to concentrate on this phase of the subject, especially during the latter half of the term.

UNIT TWELVE: ADVANCED LAYOUT AND DESIGN

Specific Objective

To stimulate individual artistic ability and imagination in planning graphic arts work in line with contemporary advertising trends.

Suggested Studies

1. Directing eye movements.
 - a. Pointing devices
 - b. Focal point, field and fringe
 - c. Impression of motion
2. Creating shape in layouts.
 - a. Departure from formal rectangle
 - b. 4-points-touching technique
 - c. Oblique design
 - d. Bleed-off of rules and photos
3. Contemporary letter-spacing and distortion trends.
4. Color selection and its effects upon display.
5. Newspaper layouts for small and large space advertisements.
6. Scaling photographs and art work.

Student Work Activities

1. Practice in converting formal, conservative advertisements, brochures, broadsides, etc., to modernistic design.
2. Practice in designing newspaper advertisements in a variety of sizes.
3. Laying out advertising pieces in several different arrangements using same copy.
4. Critical examination of many examples of pieces of work created by commercial shops, in black and white and in color.

UNIT THIRTEEN: ADVANCED COPY PREPARATION
FOR OFFSET LITHOGRAPHY

Specific Objective

To give the student more experience and to greatly increase his skill in the complete range of copy preparation for offset work.

Suggested Studies

1. Advanced art work, layout, design.
2. Repro proofs; operation of repro proof press.
3. Typewritten copy: IBI, Vari-typer, Justowriter.
4. Photo composition copy, produced in the shop or brought in from trade shop.
5. Use of "ArtType" on acetate base; use of "PresType".
6. Use of Ben Day screens.
7. Preparing copy for second or third color.
8. Layout and makeup of copy for school newspaper.

Student Work Activities

1. In keeping with the spirit of the third year program, students who demonstrate keen interest and ability in this phase of the work should be encouraged to concentrate their efforts and develop their skills in this direction.

UNIT FOURTEEN: COPY-PRODUCING TYPE WRITERS

Specific Objective

To give the student experience with the preparation of "cold-type" for offset reproduction, involving the use of copy-producing typewriters.

Suggested Studies

1. Machines on the market, such as: Coxhead Vari-typer, Fairchild Lithotype, IBM, Justowriter.
2. Direct image plates.
3. Versatility of these machines.
4. Justification for straight matter.
5. Selection of type faces available.
6. Range of possibilities of this equipment.
7. Care and maintenance of shop's machines.

Student Work Activities

1. Prepare direct image plates for offset.
2. Prepare "cold-type" copy for stationery, business forms, pamphlets, etc., to be run offset.
3. Share in periodic preparation of straight matter copy for school newspaper if it is turned out by the offset process.

UNIT FIFTEEN: PHOTO COMPOSITION

Specific Objective

To acquaint the student with the increasingly important role of photo composition in the printing industry and to give the student practice in the use of such equipment.

Suggested Studies

1. Great recent advances in photo composition.
2. Some of the machines now in use in the industry, such as:
 - a. Monophoto Filmsetter
 - b. The Headliner
 - c. Intertype Fotosetter
 - d. ATF-Hadego Photocompositor
 - e. Linofilm Photo Composition System
 - f. Filmotype
 - g. Prototype

Student Work Activities

1. Industrial visits to plants operating different types of photo composition equipment.
2. Class discussions on the advent of this equipment and consideration of the effects, present and future, on the trade of the compositor.
3. Practice with the use of Prototype, Filmotype, or other small units in the shop to produce copy for reproduction.

UNIT SIXTEEN: COLOR PROCESS PRINTING

Specific Objective

To study the physics of color and its application to printing true natural reproductions.

Suggested Studies

1. Color theories and experiments with white light by Isaac Newton, Thomas Young, James Clerk-Maxwell.
2. Primary, secondary, tertiary, intermediate colors.
3. Terminology of tone, intensity, shade, tint, hue.
4. Color separation techniques.
5. Reflection of colors to camera and use of filters.
6. Review of half-tone photographic procedure.
7. Screen angles for color negatives.
8. Inks and papers suited for color process work.
9. Register marks.
10. Order of "laying down" colors.
11. "Color key" acetate sheet use.
12. Dot etching technique.

Student Work Activities

1. Camera and plate making practices are well suited to the lithographic presses. The student will find in this field a wealth of practical application demanding careful precise workmanship.
2. Collect sets of progressive color work proofs for study and criticism.
3. Research assignments and reports on the many scientific aspects of this work.

UNIT SEVENTEEN: BOOKBINDING

Specific Objective

To give the student a knowledge of this ancient art; to develop in the student an appreciation of fine books; and to give him an opportunity to practice hand bookbinding.

Suggested Studies

1. Origin and early history of bookbinding.
2. Manuscript books, the artistic masterpieces.
3. Bookbinding, a specialty since Gutenberg's invention of letterpress printing.
4. Structure of a book: body signatures, endsheets, tapes and cords, stitching, super, headbands, casing, cover and cover ornamentation.
5. Equipment and supplies for hand binding.
6. Techniques in binding a book.
7. Procedures in re-binding old books.
8. Marbling endsheets.
9. The gold stamping press; stamping book titles.
10. Treatment of a fine book to preserve its life.
11. Modern industrial bookbinding machines and mass production techniques.

Student Work Activities

1. Binding loose sheets into book form.
2. Re-binding paperbacks into board covers.
3. Binding magazines into books.
4. Re-binding old books to like-new condition.
5. Operation of the gold stamping press.

UNIT EIGHTEEN: MODERN PACKAGING

Specific Objective

To explore the widening field of the graphic arts in consumer and impulse purchasing.

Suggested Studies

1. Printing and design for liquid containers made of plastic, glass, treated card, etc.
2. Printing and design for fruit and vegetable containers using plastic, metal, polyethylene, cellophane, card, paper, etc., and combinations thereof.
3. Pouch, stand up, peek-a-boo styles of packaging for clothing, appliances, notions, counter displays, etc.
4. Application of wax, plastic and varnish to materials.
5. Sales appeal of modern packaging; the great role of the graphic arts in achieving this appeal.

Student Work Activities

1. Layout and design necessarily predominate in student' activity.
2. Plant visitation to view processes will inspire interest in packaging.

UNIT NINETEEN: COSTING AND JOB ESTIMATING

Specific Objective

To present the financial requisites which govern production methods in addition to exploring executive opportunities.

Suggested Studies

1. Calculating composing costs.
2. Calculating presswork and bindery costs.
3. Estimating amount of paper, ink, etc., required and cost of each.
4. Addition of office, plant, delivery and various other overhead and "hidden" expenses (maintenance, taxes, rent, replacements, etc.)
5. Selection of most suitable methods of printing in regard to wages, materials and machinery economy.
6. Consideration of "trade shop" services and "farmout".
7. Goodwill and customer satisfaction.
8. The need to employ competent help and to observe maintenance schedules.
9. Job opportunities as salesman, estimator, production co-ordinator and other "office" positions.

Student Work Activities

1. Comparative studies of all methods of setting and printing ruled forms, school forms, etc., as if using the equipment and materials within the school shop should be made.
2. Given the scale of wages currently paid to graphic arts workers, a paper supply house catalogue, and a few incidental additional cost features, a student will estimate and calculate the cost of producing letterheads, invoices, or a school production item.

UNIT TWENTY: THE FUTURE IN THE GRAPHIC ARTS INDUSTRY

Specific Objective

To inspire interest in and anticipation of improvements and new processes which will result from present day research being carried on in all graphic arts areas.

Suggested Studies

1. The future for the industry:
 - a. Advancement of photographic application
 - b. Research in the chemicals and metals
 - c. Application of electronic discoveries
 - d. Acceleration of machine operations
2. The future for employees:
 - a. Specialization in occupations
 - b. New occupations
 - c. Keeping abreast of new developments by perusal of trade journals, leisure time study and participation in graphic arts clubs and associations.
3. The future for school graduates:
 - a. Decision for apprenticeship in trade where best qualified
 - b. Decision for executive field or advertising agency, etc.
 - c. "Own business" possibilities

Student Work Activities

1. Discussion and counselling by instructor might best assist in vocational decisions.
2. Qualified speakers from various branches of the industry should be welcomed.
3. Part time work by third year students in local commercial printing plants.

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